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SEASONAL AND SPATIAL VARIATION OF FLOCK SIZE OF ASIAN OPENBILL STORK ANASTOMUS OSCITANS AT FORAGING SITE IN NAGAPATTINAM DISTRICT, TAMILNADU, INDIA

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ABSTRACT

Seasonal and spatial variations of flock size of Asian Openbill Stork Anastomus oscitans in Nagapattinam district, Tamilnadu, India were studied during period from October 2016 to September 2017. During these study periods 48 different sites 122 foraging sites were observed. The flock size range from 1 to 19 birds and mean flock size 5.25±3.21. Flock size and availability of prey was maximum observed during pre-monsoon and monsoon season. Most commonly sighted in agriculture and marshes habitats 57% and least sighted were observed in river bank and ponds 24%. Flock size and availability of prey variation were found different season and between the habitat. Relationship between the prey availability and flock size was positively correlated. Present study reveals that variation of flock size in related to availability of prey.

INTRODUCTION

Habitat selection of the organisms is prime important in life time. It is varies across numerous scales of space and time. Therefore, the use of some habitats over others, and the rules that individuals use to make those choices, is a dominant them in fields ranging from behavioral ecology to evolutionary biology (Raynor et al.2017). Habitats are heterogenous. 'Rich' habitats give higher fitness to the organisms living there where 'poor' habitats give lower fitness. How rich and poor are defined is also of importance for survival offspring (Meganathan and Urfi 2008). The quality of the habitat has many variables such as food availability, predator occurrence, easiness of defense, distance to human settlements and many others.

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There are nine species of stork present in India (Ali and Ripley 1987). Asian Openbill Stork *Anastomus oscitans* is a large wading bird in the stork belong to family of Ciconiidae. It is found mainly in the Indian subcontinent and Southeast Asia (Hancock et al., 1992). It is very commonest stork in India feeding on mollusks, crabs (Anam et al.2016). Present study on the flock size and prey availability of Asian Openbill Stork at foraging site is likely to be significant for developing management and conservation action plan since it is Least Concern species (Birdlife International 2001).

MATERIALS AND METHODS

2.1 Study Area

Nagapattinam District is one among 32 Districts of Tamil Nadu, India. The District has an area of 2715.83 sq. km. It is bounded by Bay of Bengal on the east, the Palk strait on the south, the Thiruvarur District on the west and Cuddalore District on the north. The present study was carried out in Sembanarkoil at Tharagambadi Taluk, Nagapattinam District (11º 18' N, latitude 79º 50' E longitude) in the Cauvery Delta of Tamil Nadu. The area is dominated by wet agricultural lands with paddy (*Oryza sativa*) being the predominant crop cultivated. Other crops also cultivated include sugarcane, groundnut, banana, pulses and other cereals. Four seasons were distinguished at the study area based on rainfall viz., monsoon (October-December), post-monsoon (January-March), summer (April-June) and pre-monsoon (July-September). In general January is the coolest month and May is the warmest month in the study area.

2.2 Methods

Present study was conducted from October 2016 to September 2017. Observation was made once in the fortnight at each foraging site using 7X50 binocular. During the study period the data collected at time of early in the morning 0600h to 0800h and evening 1600h to 1800h. A flock size was identified by pointing the binoculars towards the flock and by counting the number of individuals. Flock size was estimated by number of birds present within radius of 10 meter circle of focal bird. Prey availability was estimated by after completed of foraging of birds. At each foraging ground estimated by sampling time ten 1 m^2 quadrate and each quadrate number of mollusks including broken shell, live specimen and crab species were estimated. Habitat type was also recorded during the foraging time. Habitat type was categorized into five different habitat viz., river bank, irrigation canal, ponds, agriculture and Marshes followed by Pramanik et al., (2016).

2.3 Data Analysis

Descriptive statistics were computed for all relevant data. Seasonal variation of prey availability pooled data for four seasons such as pre monsoon, monsoon, post monsoon and summer. Spatial variation of flock size compare with different habitat by using a One-way ANOVA test. Correlation was used for compared the relationship between prey availability and flock size.

RESULTS AND DISCUSSION

During these study periods 38 different sites and 122 foraging sites of Asian Openbill Stork were observed. The result of the studies shows that large flock size in month of October and small in month of May were observed Fig.1. The flock size range from 1 to 19 birds and mean flock size 5.25±3.21.Variation of flock size was statically significant different among the season (One way ANOVA: F= 3.14, P = 0.001). The mean flock size and prey availability of high values were recorded during pre-monsoon and monsoon season respectively Table-1. This variation was found in large wading birds in related to water level of foraging sites (Gimenes and Anjos 2011). Many studies of large wading bird foraging investigated the effects of water depth or vegetation on wading bird foraging site selection (Lantz et el.2011) or foraging success (Maheswaran and Rahmani 2002, Kalam and Urfi 2006). Evaluating foraging habitat selection, flock size and foraging success of wading birds in a system with controlled prey availability is a powerful tool in understanding how seasonal changes as India. This clearly suggests that monsoon pattern linkage with availability of prey in storks (Ali and Ripley 1987, Urfi 1998).

Similarly spatial variation of the flock size was statically significant different between the habitats (One way ANOVA: F= 2.97, P = 0.02). Most commonly sighted in agriculture and marshes habitats 57% and least sighted were observed in river bank and ponds 24%. The high value of flock size and availability of prey recorded in Agriculture and Marshes habitat, respectively Table-2. Agriculture habitat selected positively as foraging habitat by wading bird species on a seasonal basics when natural wetland may have been dry or too deep for foraging (Sundar 2004). Relationship between the availability of prey and flock size was positively correlated R^2=0.703, P=0.001 Fig.2. Sundar (2006) reported that flock size and density were strongly correlated in all four species of stork including the Asian Openbill Stork at Uttarpradesh, India. Increasing wetland size and extent of wetlands in the landscape affected flock size of Asian Openbill Stork implying that prey availability may be the most important factor affecting flocking in this species. In our study revealed that prey availability the most important factor influencing variation flock size in this species. Present study mainly focused at determining important foraging sites for the stork family and variations on flock size is found among the habitats. Apart from of these studies, no current information is available on flock size of Asian Openbill Stork among season and between the habitats at Nagapattinam District, Tamilnadu. These studies reveal that variation of flock size in related to availability of food. The further study needed for foraging ecology of Asian Openbill Stork in related to water level at foraging site, foraging success, habitat selection etc.. This information further used for conservation since it is least concern.

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APPENDIX

Table – 1: *Prey Availability and Flock Size of Asian Openbill Stork at Foraging Site in Different Season During Study Period 2016 – 2017*

S.No	Season	Sample Size (N)	Prey Availability Mean ± SD	Flock size Mean ± SD
1.	Pre monsoon	34	8.75±5.48	5.73±3.08
2.	Monsoon	32	8.54±3.57	5.55±3.13
3.	Post monsoon	25	7.12±3.84	5.41±2.22
4.	Summer	31	5.12±2.56	3.71±1.82

Table – 2: *Prey Availability and Flock Size of Asian Openbill Stork at Foraging Site in Different Habitat During Study Period 2016 – 2017*

S.No	Habitat Type	Sample Size (N)	Prey Availability	Flock size
			Mean ± SD	Mean ± SD
1.	River Bank	15	7.13±4.49	4.53±3.42
2.	Irrigation Canal	24	7.67±4.94	5.2±3.31
3.	Ponds	15	4.33±2.96	3.1±1.60
4.	Agriculture	38	8.47±5.34	6.2±3.29
5.	Marshes	30	8.06±4.54	5.83±3.10

Figure – 1: *Seasonal Variation of Flock Size of Asian Openbill Stork During Study Period 2016 – 2017*

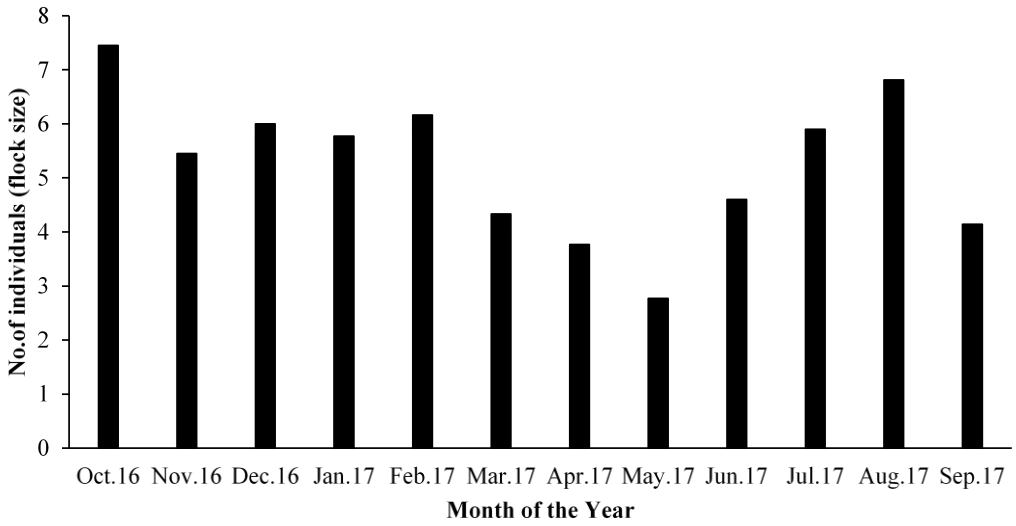
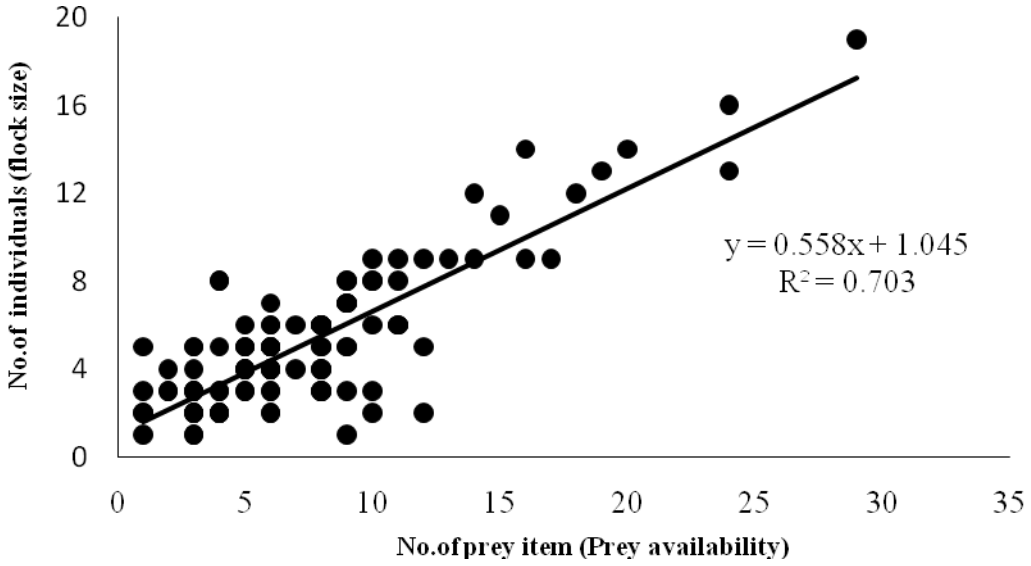


Figure – 2: *Relationship Between the Prey Availability and Flock Size of Asian Openbill Stork During Study Period 2016 – 2017*



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